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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,714	09/17/2003	Daijiro Inoue	57810-076	2234

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EXAMINER

SEFER, AHMED N

ART UNIT PAPER NUMBER

2826

DATE MAILED: 11/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/663,714

Applicant(s)

INOUE ET AL.

Examiner

A. Sefer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4,6-10,12 and 14-26 is/are pending in the application.
- 4a) Of the above claim(s) 8,10,17-22,24 and 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,6,7,9,12,14-16,23 and 26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/15/06 has been entered.

### ***Drawings***

2. Applicants statement that the claim feature requiring the second optical guide layer is illustrated in fig. 20 and page 46 of the specification is convincing and the objection to the drawings is withdrawn.

3. Applicants elected Embodiment 4, shown in fig. 14 (see response to restriction requirement dated 2/15/05). Therefore, claims 24 and 25 which are readable on a non-elected embodiment are withdrawn from consideration.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 12 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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The recitation calling for, "... between said active layer and **said first conductivity type first and second nitride-based semiconductor layers**" is not understood. Clarification is required.

Claim 12 recites the limitation "'... between said active layer and **said first conductivity type first and second nitride-based semiconductor layers**.'" There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-4, 6, 15, 16, 23 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura ("Okumura") US PG-Pub 2005/0211971 in view of Sasanuma et al. ("Sasanuma") JP 2000-101142.

Okumura discloses in figs. 1 and 2 a nitride-based semiconductor light-emitting device comprising: a first conductivity type first nitride-based semiconductor layer 3/4 formed on a substrate; an active layer 6; a first undoped optical guide layer 8 (par. 51) formed on said active layer; a second conductivity type second nitride-based semiconductor layer 9, having a single layer structure with a thickness of at least 0.1  $\mu\text{m}$  (par. 57) formed on said first undoped optical guide layer; a contact layer 10 formed on said second nitride-based semiconductor layer; and an

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electrode 11 formed on said contact layer, but lacks anticipation of an undoped contact layer having a thickness.

Sasanuma discloses (fig. 2 and par. 27 of machine translated document) a nitride-based semiconductor light-emitting device comprising: a first conductivity type first nitride-based semiconductor layer **n-AlGaN** formed on a substrate or first conductivity type GaN substrate (**as in claim 23**); an active layer 13, formed on said first nitride-based semiconductor layer; a second conductivity type second nitride-based semiconductor layer consisting **p-AlGaN** (**as in claim 3**); an undoped contact layer 11 having a band gap smaller than the band gap of said second nitride-based semiconductor layer (**as in claim 2**) formed on said second nitride-based semiconductor layer; and an electrode 12 formed on said undoped contact layer, wherein said undoped contact layer has a thickness within the recited range (fig. 3).

Therefore, in view of Sasanuma's teachings, one having an ordinary skill in the art at the time the invention was made would be motivated to modify Okumura's device by incorporating an undoped contact layer having the specified thickness since that would reduce leakage as taught by Sasanuma.

Regarding claim 4, Sasanuma/Okumura discloses a first conductivity type first nitride-based semiconductor layer being an n-type first nitride-based semiconductor layer, and said second conductivity type second nitride-based semiconductor layer being a p-type second nitride-based semiconductor layer.

Regarding claim 6, Sasanuma discloses undoped contact layer having a band gap larger than the band gap of said active layer.

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Regarding claim 15, Sasanuma discloses in fig. 2 a second conductivity type second nitride-based semiconductor layer including a second conductivity type cladding layer **p-AlGaN** having a projection, said contact layer 11 being formed on the upper surface of said projecting portion of said second conductivity type cladding layer, and said projecting portion of said second conductivity type cladding layer and said contact layer constitute a ridge portion.

Regarding claim 16, Sasanuma discloses in fig. 2 an active layer **InGaN-MQW** consisting of a nitride-based semiconductor containing In, said nitride-based semiconductor light-emitting device further comprising a protective layer **n-InGaN** of a nitride-based semiconductor layer formed on said active layer.

The recitation calling “for preventing In contained in said active layer from desorption” attempts to distinguish the invention from the prior art in terms of function rather than structure. See *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971; *In re Danly*, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959).

8. Claims 7, 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura in view of Sasanuma as applied to claim 1 above, and further in view of Sugiura et al. (“Sugiura”) JP 10-215034.

The combined references disclose the device structure as recited in the claim, but do not specifically disclose the undoped contact layer being single undoped nitride-based semiconductor layer.

Sugiura discloses in fig. 2, a nitride-based semiconductor light-emitting device comprising: a first conductivity type first nitride-based semiconductor layer **14** formed on a

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substrate; an active layer 16, formed on said first nitride-based semiconductor layer; a second conductivity type second nitride-based semiconductor layer consisting 18/19; an undoped contact layer 20 formed on said second nitride-based semiconductor layer; and an electrode 22 formed on said undoped contact layer, wherein said undoped contact layer being single undoped nitride-based semiconductor layer.

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate Sugiura's teachings so as to reduce contact resistance of semiconductor layer and electrode as taught by Sugiura.

Regarding claim 7, Sugiura discloses undoped contact layer containing InGaN.

Regarding claim 14, Sugiura discloses said second conductivity type second nitride-based semiconductor layer including a second conductivity type second nitride-based semiconductor layer consisting of AlGa<sub>N</sub> 18, and said first undoped optical guide layer includes an undoped optical guide layer consisting of GaN.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Sefer whose telephone number is (571) 272-1921.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ANS

October 28, 2006



*A. Sefer*  
*Patent Examiner*  
*Art Unit 2826*